

New record of *Cercosaura ocellata* Wagler, 1830 (Squamata, Gymnophthalmidae) in northeastern Brazil, with a distribution map for the species in South America

Raul Fernandes Dantas Sales*, Jaqueiuto da Silva Jorge, Matheus Meira-Ribeiro and Eliza Maria Xavier Freire

Universidade Federal do Rio Grande do Norte, Centro de Biociências, Departamento de Botânica e Zoologia, Laboratório de Herpetologia, Campus Universitário Lagoa Nova. CEP 59078-970. Natal, RN, Brazil.

* Corresponding author. E-mail: raulsales17@gmail.com

Abstract: Herein, we provide a new record of *Cercosaura ocellata* Wagler, 1830 in the Atlantic Forest biome, northeastern Brazil, and a distribution map for the species in South America. The new record was in Extremoz municipality, state of Rio Grande do Norte, filling a gap in the known geographic distribution of the species between the states of Ceará and Pernambuco.

DOI: 10.15560/10.6.1531

The family Gymnophthalmidae is composed of small lizards (less than 60 mm in adult snout-vent length), distributed from southern Central America to southern South America east of the Andes (Pellegrino *et al.* 2001; Vitt and Caldwell 2014). Gymnophthalmids occur in lowland rain forests (Amazon, Atlantic Forest), high-elevation habitats (tropical forests close to the Andes), temperate grasslands (Pampa in southern South America), and savanna-like habitats, including Cerrado in central Brazil and the semiarid Caatinga in northeastern Brazil (Vitt and Caldwell 2014). The family is composed of approximately 244 species (Uetz and Hošek 2014).

The genus *Cercosaura* Wagler, 1830 was redefined after a systematic review established by Doan (2003), which synonymized *Pantodactylus* and *Prionodactylus* with *Cercosaura*, including 11 species in this genus (Doan 2003). After other systematic reviews, some species were synonymized and others were described, and currently there are 13 species in the genus (Doan and Lamar 2012; Uetz and Hošek 2014), six with occurrence recorded for Brazil (Bérnills and Costa 2012). The species *Cercosaura ocellata* Wagler, 1830 is diagnosed by a cylindrical body, tail long, round in cross section, limbs well developed, pentadactyl, with all digits clawed, and quadrangular dorsal scales in transverse and longitudinal rows; it currently contains three subspecies (Ávila-Pires 1995).

Cercosaura ocellata is widely distributed in South America (Figure 1), with known records in different biomes, including the Amazon Forest (Vanzolini 1972, 1986; Ávila-Pires 1995; Macedo *et al.* 2008; Ávila-Pires *et al.* 2009, 2010; Mendez-Pinto and Tello 2010; Bernarde *et al.* 2011; Mendez-Pinto and Souza 2011), Cerrado (Gainsbury and Colli 2003; Shepard 2007; Uetanabaro *et al.* 2007; Vaz-Silva *et al.* 2007; Valdujo *et al.* 2009; Recoder *et al.* 2011; Novelli *et al.* 2012), Pampa (Santos *et al.* 2005), Atlantic Forest (Couto-Ferreira *et al.* 2011; Oliveira and Moura 2013) and Caatinga (Borjes-Norjosa and

Caramaschi 2003). Besides Brazil, there are also published records for the species in Argentina (Tedesco and Aguirre 1998), Bolivia (Doan and Lamar 2012), Colombia (Doan and Lamar 2012), French Guiana (Doan and Lamar 2012), Guyana (Cole *et al.* 2013), Peru (Dixon and Soini 1986; Ávila-Pires 1995; Duellman 2005), Suriname (Hoogmoed 1973; Ávila-Pires 1995) and Venezuela (Doan and Lamar 2012). The type-locality of *C. ocellata* was suggested by

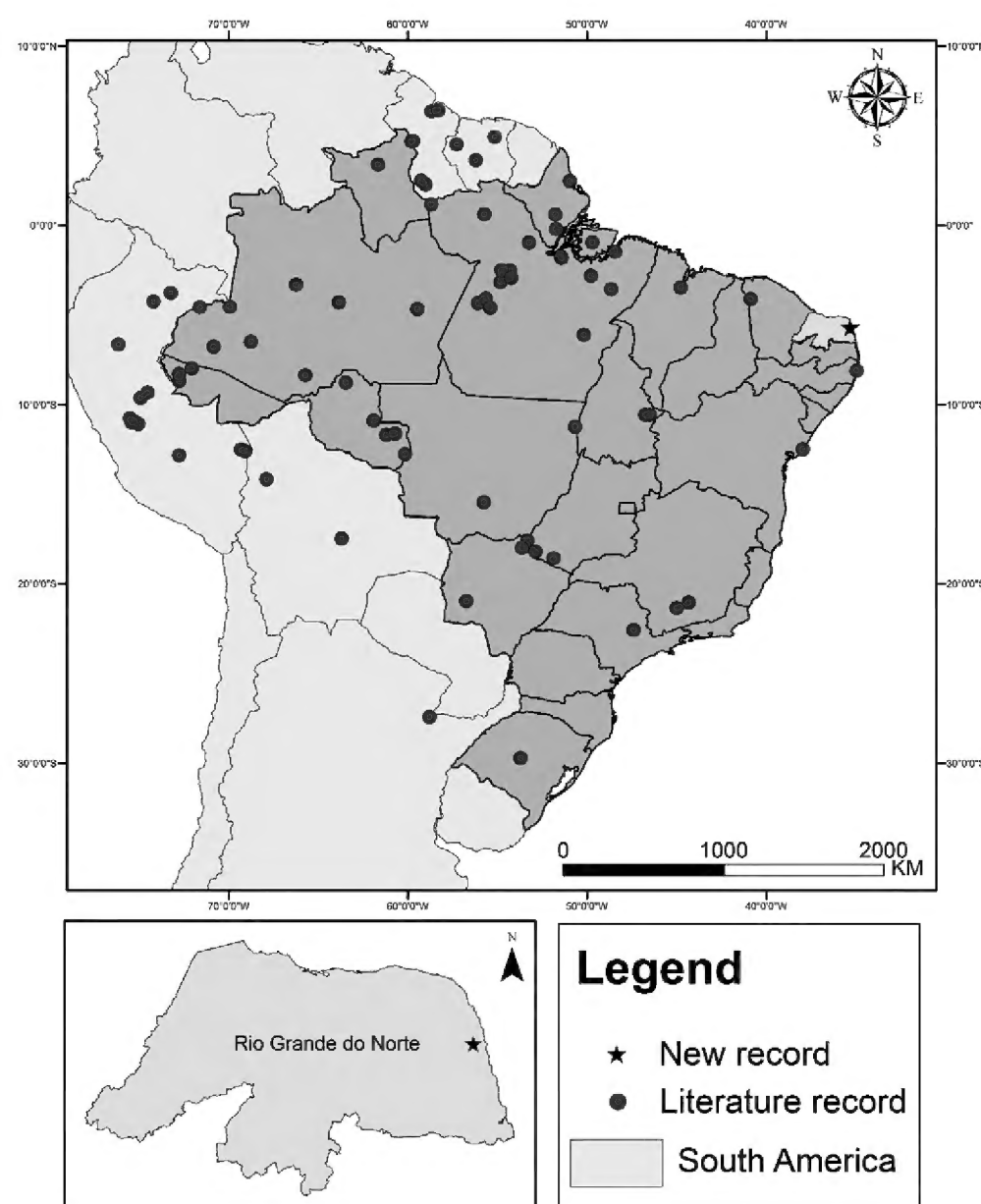


FIGURE 1. Known geographic distribution of *Cercosaura ocellata* in South America. Brazil is shaded a darker color for emphasis.



FIGURE 2. Individual of *Cercosaura ocellata* (CHBEZ 3984; SVL = 30.4 mm) collected in Centro Tecnológico de Aquicultura, Extremoz municipality, state of Rio Grande do Norte, Brazil. Photo: RFDS.

Ruibal (1952) as northeastern South America, although the precise location is unknown. Despite that, there are only four accurate records in the literature for the species in northeastern Brazil, in the states of Maranhão (Ávila-Pires 1995), Ceará (Borjes-Norjosa and Caramaschi 2003), Pernambuco (Oliveira and Moura 2013) and Bahia (Couto-Ferreira *et al.* 2011).

Herein, we provide a new record for *Cercosaura ocellata* in the Atlantic Forest biome, northeastern Brazil. Additionally, we provide a distribution map for the species in South America. To build the map, we made an extensive search in the literature in six online bibliographic databases (Web of Science, JSTOR, Scielo, Scopus, Google Scholar), looking for records of the species. Additionally, we also obtained records in the Vertnet database (<http://www.vternet.org/index.html>). All localities with geographic coordinates are in the Appendix. We georeferenced some localities where geographical coordinates were not provided by the authors.

The new record was in Centro Tecnológico de Aquicultura (CTA), Extremoz municipality, state of Rio Grande do Norte, Brazil (5.7° S, 35.31° W; Figure 1). The CTA belongs to the Universidade Federal do Rio Grande do Norte, and is an area designed for shrimp research. The vegetation of the CTA area was originally typical of a mangrove ecosystem, but much of its environment was degraded and turned into breeding grounds for shrimp. The remaining vegetation is composed of small shrubs, with small freshwater ponds. During a survey in the area on 11 May 2013, one of us (RFDS) collected an adult individual of *Cercosaura ocellata ocellata* (30.4 mm SVL; Figure 2) at night (approximately 19:00 h) above an aquatic plant at the edge of a freshwater pond. The specimen was collected under permanent permit number 12734-1, issued by Sisbio/ICMBio, and was deposited in

the Herpetological Collection of the Universidade Federal do Rio Grande do Norte (CHBEZ 3984).

This new record fills a gap in the known geographic distribution of *C. ocellata* (Figure 1) between the states of Ceará (640 km east of Planalto de Ibiapaba) and Pernambuco (267 km north of Mata de Tejió). The low number of records for this cryptic species in northeastern Brazil is undoubtedly a result of the low number of herpetological surveys in this region.

LITERATURE CITED

- Ávila-Pires, T.C.S. 1995. Lizards of Brazilian Amazonia. *Zoologische Verhandelingen, Leiden* 299(1): 1–706 (<http://www.repository.naturalis.nl/document/149074>).
- Ávila-Pires, T.C.S., L.J. Vitt, S.S. Sartorius and P.A. Zani. 2009. Squamata (Reptilia) from four sites in southern Amazonia, with a biogeographic analysis of Amazonian lizards. *Boletim do Museu Paraense Emílio Goeldi Ciências Naturais* 4(2): 99–118 (<http://scielo.iec.pa.gov.br/pdf/bmpegn/v4n2/v4n2a02.pdf>).
- Ávila-Pires, T.C.S., M.S. Hoogmoed and W.A. Rocha. 2010. Notes on the Vertebrates of northern Pará, Brazil: A forgotten part of the Guianan Region, I. Herpetofauna. *Boletim do Museu Paraense Emílio Goeldi Ciências Naturais* 5(1): 13–112 (<http://scielo.iec.pa.gov.br/pdf/bmpegn/v5n1/v5n1a02.pdf>).
- Bernarde, P.S., R.A. Machado and L.C.B. Turci. 2011. Herpetofauna of Igarapé Esperança area in the Reserva Extrativista Riozinho da Liberdade, Acre – Brazil. *Biota Neotropica* 11(3): 117–144 (doi: 10.1590/S1676-06032011000300010).
- Bérnils, R.S. and H.C. Costa (org.). 2012. *Brazilian Reptiles: List of species*. Version 2012.1. Accessible at <http://www.sbherpetologia.org.br>. Sociedade Brasileira de Herpetologia. Captured on 22 July 2014.
- Borges-Nojosa, D.M. and U. Caramaschi. 2003. Composição e análise comparativa da diversidade das afinidades biogeográficas dos lagartos e anfíbenídeos (Squamata) dos brejos nordestinos; pp. 463–512, in: I.R. Leal, M. Tabarelli and J.M.C. Silva (eds.). *Ecologia e Conservação da Caatinga*. Recife: Editora Universitária UFPE.
- Cole, C.J., C.R. Townsend, R.P. Reynolds, R.D. MacCulloch and A. Lathrop. 2013. Amphibians and reptiles of Guyana, South America: Illustrated keys, annotated species accounts, and a biogeographic synopsis. *Proceedings of the Biological Society of Washington* 125(4): 317–578. (doi: 10.2988/0006-324X-125.4.317)
- Couto-Ferreira, D., M.S. Tinôco, M.L.T. Oliveira, H.C. Browneribeiro, C.P. Fazolato, R.M. Silva, G.S. Barreto and M.A. Dias. 2011. Restinga lizards

- (Reptilia: Squamata) at the Imbassaí Preserve on the northern coast of Bahia, Brazil. *Journal of Threatened Taxa* 3(8): 1990–2000 (<http://threatenedtaxa.org/ZooPrintJournal/2011/August/danilo.htm>)
- Dixon, J.R. and P. Soini, 1986. *The Reptiles of the Upper Amazon Basin, Iquitos Region, Peru*. Milwaukee Public Museum. 154 pp.
- Doan, T.M. 2003. A new phylogenetic classification for the gymnophthalmid genera *Cercosaura*, *Pantodactylus* and *Prionodactylus* (Reptilia: Squamata). *Zoological Journal of the Linnean Society* 137(1): 101–115. (doi: 10.1046/j.1096-3642.2003.00043.x)
- Doan, T.M. and W.W. Lamar. 2012. A new montane species of *Cercosaura* (Squamata: Gymnophthalmidae) from Colombia, with notes on the distribution of the genus. *Zootaxa* 3565: 44–54 (<http://www.mapress.com/zootaxa/list/2012/3565.html>).
- Duellman, W.E. 2005. Cusco Amazónico. *The Lives of Amphibians and Reptiles in an Amazonian Rainforest*. Ithaca, N.Y.; London: Cornell University Press. 433 pp.
- Gainsbury, A.M. and G.R. Colli. 2003. Lizard assemblages from natural cerrado enclaves in southwestern Amazonia: The role of stochastic extinctions and isolation. *Biotropica* 35(4): 503–519 (doi: 10.1111/j.1744-7429.2003.tb00607.x).
- Hoogmoed, M.S. 1973. Notes on the herpetofauna of Surinam. IV. The lizards and amphisbaenians of Surinam. *Biogeographica* 4: 1–419 (<http://www.springer.com/life+sciences/animal+sciences/book/978-90-6193-205-5>).
- Macedo, L.M., P.S. Bernarde and A.S. Abe. 2008. Lagartos (Squamata: Lacertilia) em áreas de floresta e de pastagem em Espigão do Oeste, Rondônia, sudoeste da Amazônia, Brasil. *Biota Neotropica* 8(1): 133–139 (doi: 10.1590/S1676-06032008000100016).
- Mendes-Pinto, T.J. and J.C.R. Tello. 2010. Répteis Squamata de uma área de transição floresta-savana no oeste do estado do Pará, Brasil. *Revista de Ciências Ambientais* 4(1): 19–35 (<http://sphinx.unilasalle.edu.br/index.php/Rbca/article/download/89/106>).
- Mendes-Pinto, T.J. and S.M. Souza. 2011. Preliminary assessment of amphibians and reptiles from Floresta Nacional do Trairão, with a new snake record for the Pará state, Brazilian Amazon. *Salamandra* 47(4): 199–206 (http://www.salamandra-journal.com/index.php?option=com_docman&task=doc_download&gid=261&Itemid=72).
- Novelli, I.A., P.S. Lucas, R.G. Carvalho, R.C. Santos and B.M. Sousa. 2012. Lagartos de áreas de Cerrado na Reserva Biológica Unilavras-Boqueirão, Ingá, sul de Minas Gerais, Brasil. *Biota Neotropica* 12(2): 147–153 (doi: 10.1590/S1676-06032012000300017).
- Oliveira, C.N. and G.J.B. Moura. 2013. *Cercosaura ocellata* Wagler, 1830 (Lacertilia, Gymnophthalmidae): Distribution extension of northeastern Brazil. *Biota Neotropica* 13(3): 387–389 (doi: 10.1590/S1676-06032013000300037).
- Pellegrino, K.C.M., M.T. Rodrigues, Y. Yonenaga-Yassuda and J.W. Sites Junior. 2001. A molecular perspective on the evolution of microteiid lizards (Squamata, Gymnophthalmidae), and a new classification for the family. *Biological Journal of the Linnean Society* 74(3): 315–338 (doi: 10.1006/bijl.2001.0580).
- Recoder, R.S., M. Teixeira-Junior, A. Camacho, P.M.S. Nunes, T. Mott, P.H. Valdujo, J.M. Ghellere, C. Nogueira and M.T. Rodrigues. 2011. Répteis da Estação Ecológica Serra Geral do Tocantins, Brasil Central. *Biota Neotropica* 11(1): 263–282 (doi: 10.1590/S1676-06032011000100026).
- Ruibal, R. 1952. Revisionary studies of some South American Teiidae. *Bulletin of the Museum of Comparative Zoology* 106(11): 477–529 (<http://www.biodiversitylibrary.org/page/28870064>).
- Santos, T.G., K.A. Kopp, M.R. Spies, R. Trevisan and S.Z. Cechin. Répteis do campus da Universidade Federal de Santa Maria, RS, Brasil. *Biota Neotropica* 5(1): 171–178 (doi: 10.1590/S1676-06032005000100016).
- Shepard, D.B. 2007. Habitat but not body shape affects predator attack frequency on lizard models in the Brazilian Cerrado. *Herpetologica* 63(2): 193–202 (doi: 10.1655/0018-0831(2007)63[193:HBNBSA]2.0.CO;2).
- Silva Jr, N.J. and J.W. Sites Jr. 1995. Patterns of diversity of Neotropical squamate reptile species with emphasis on the Brazilian Amazon and the conservation potential of indigenous reserves. *Conservation Biology* 9(4): 873–901 (doi: 10.1046/j.1523-1739.1995.09040873.x).
- Sousa, B.M., A.E.R. Nascimento, S.C. Gomides, C.H. Varela Rios, A.H. Hudson and I.A. Novelli. 2010. Répteis em fragmentos de Cerrado e Mata Atlântica do Campo das Vertentes, Estado de Minas Gerais, sudeste do Brasil. *Biota Neotropica* 10(2): 129–138 (doi: 10.1590/S1676-06032012000300002).
- Tedesco, M.E. and R. Aguirre. 1998. *Cercosaura ocellata petersi* Ruibal, 1952 (Squamata, Gymnophthalmidae). Nuevo registro para la lacertofauna de la Republica Argentina. *Cuadernos de Herpetologia* 12(1): 53.
- Uetanabaro, M., F.L. Souza, P. Landgraf Filho, A.F. Beda and R.A. Brandão. 2007. Anfíbios e répteis do Parque Nacional da Serra da Bodoquena, Mato Grosso do Sul, Brasil. *Biota Neotropica* 7(3): 279–289 (doi: 10.1590/S1676-06032007000300030).
- Uetz, P. and J. Hošek (eds.). *The Reptile Database*. Accessible at <http://www.reptiledatabase.org>. Captured on 13 August 2014.
- Valdujo, P.H., C.C. Nogueira, L. Baumgarten, F. Henrique, G. Rodrigues, R.A. Brandão, A. Eterovic, M.B. Ramos-Neto and O.A.V. Marques. 2009. Squamate reptiles from Parque Nacional das Emas and surroundings, Cerrado of Central Brazil. *Check List* 5(3): 405–417 (<http://www.checklist.org.br/getpdf?SL001-09>).
- Vanzolini, P.E. 1972. Miscellaneous notes on the ecology of some Brazilian lizards (Sauria). *Papéis Avulsos de Zoologia* 26(8): 83–115.
- Vanzolini, P.E. 1986. Levantamento herpetológico da área do estado de Rondônia sob a influência da rodovia BR-364. Relatório de Pesquisa n°1, CNPq, Brasília.
- Vaz-Silva, W., A.G. Guedes, P.L. Azevedo-Silva, F.F. Gontijo, R.S. Barbosa, G.R. Aloísio and F.C.G. Oliveira. 2007. Herpetofauna, Espora Hydroelectric Power Plant, state of Goiás, Brazil. *Check List* 3(4): 338–345 (<http://www.checklist.org.br/getpdf?SL018-07>).
- Vitt, L.J. and J.P. Caldwell. 2014. *Herpetology: An Introductory Biology of Amphibians and Reptiles*. 4th Edition. San Diego: Academic Press. 757 pp.

AUTHORS' CONTRIBUTION STATEMENT: RFDS collected the data in the field, made the literature review, organized the geographic coordinates, and wrote the text; JSJ wrote the text; MMR made the distribution map; EMXF identified the species and revised the text.

RECEIVED: August 2014

ACCEPTED: October 2014

PUBLISHED ONLINE: December 2014

EDITORIAL RESPONSIBILITY: Ross MacCulloch

APPENDIX. Geographic coordinates (latitude and longitude in decimal degrees) of the localities recorded for *Cercosaura ocellata*.

BRAZIL – Acre: Porongaba, Rio Juruá (08.66667° S, 72.7833° W; Ávila-Pires 1995); Juruá (08.26667° S, 72.7833° W; Ávila-Pires *et al.* 2009); RESEx Riozinho da Liberdade (07.95554° S, 72.0773° W; Bernarde *et al.* 2011); **Amapá:** Calçoene (02.505°N, 50.952° W; Ávila-Pires 1995); Cupixi (00.6183°N, 51.771° W; Ávila-Pires 1995); Mazagão, Rio Maracá (00.181° S, 51.734° W; Ávila-Pires 1995); **Amazonas:** Borba (04.645° S, 59.472° W; Ávila-Pires 1995); Rio Urucu (04.278° S, 63.849° W; Ávila-Pires 1995); Condor, Rio Juruá (06.75° S, 70.85° W; Ávila-Pires 1995); Lago Jaiú, Rio Juruá (06.4666° S, 68.7666° W; Ávila-Pires 1995); Área VV, Rio Juruá (3.283° S, 66.2333° W; Ávila-Pires 1995); Rio Solimões, Benjamim Constant (04.5205° S, 69.955° W; Ávila-Pires 1995); Rio Javari, Estirão do Equador (04.537° S, 71.62° W; Ávila-Pires 1995); Ituxi (8.3333° S, 65.71666° W; Ávila-Pires *et al.* 2009); **Bahia:** Reserva Imbassaí, Mata de São João (12.478611° S, 37.957778° W; Couto-Ferreira *et al.* 2011); **Ceará:** Planalto de Ibiapaba (04.092° S, 40.8633° W; Borges-Norjosa and Caramaschi 2003); **Goiás:** Parque Nacional das Emas (18.191° S, 52.867° W; Valdujo *et al.* 2009); UHE Espora (18.5635° S, 51.857° W; Vaz-Silva *et al.* 2007); **Maranhão:** Arari (03.452° S, 44.767° W; Ávila-Pires 1995); **Mato Grosso:** Rio Sapo, Araguaia (17.565° S, 53.316° W; Valdujo *et al.* 2009); Rio Araguaia, Fazenda Saramandaia (17.9° S, 53.49° W; Valdujo *et al.* 2009); Chapada dos Guimarães (15.43332958° S, 55.75° W; Vertnet database); Mato Verde (11.216667° S, 50.66667° W; Vertnet database); **Mato Grosso do Sul:** Rio Taquari, Fazenda Vista Bonita (17.99° S, 53.629° W; Valdujo *et al.* 2009); **Minas Gerais:** Ritanópolis (21.0285° S, 44.3203° W; Sousa *et al.* 2010); Reserva Biológica Unilavras-Boqueirão (21.3463° S, 44.99° W; Novelli *et al.* 2012); Parque Nacional da Serra da Bodoquema (20.973° S, 56.731° W; Uetanabaro *et al.* 2007); **Pará:** Maloquinha (04.3155° S, 56.08° W; Vanzolini 1972); Monte Cristo (04.065° S, 55.644° W; Vanzolini 1972); Ilha de Marajó (00.936° S, 49.7° W; Ávila-Pires 1995); Rio Capim (3.55° W, 48.653° W; Ávila-Pires 1995); Belém (01.445° S, 48.44° W; Ávila-Pires 1995); Rio Tocantins, Baião (02.8° S, 49.78° W; Ávila-Pires 1995); Serra Norte (06.086°S; 50.176° W; Ávila-Pires 1995); Floresta Nacional de Caxiuanã (01.792301° S, 51.43375° W; Ávila-Pires 1995); Taperinha (02.491° S, 54.303° W; Ávila-Pires 1995); Curuá-Uma (03.15° S, 54.8333° W; Ávila-Pires *et al.* 2009); FLOTA Paru (00.94396° S, 53.236295° W; Ávila-Pires *et al.* 2010); ESEC Grão-Pará – north (01.185441°N, 58.6961° W; Ávila-Pires *et al.* 2010); ESEC Grão-Pará – centre (00.630433°N, 55.7285° W; Ávila-Pires *et al.* 2010); Sítio Mapinguari, Santarém (02.4805° S, 54.7702° W; Mendes-Pinto and Tello 2010); Floresta Nacional do Trairão (04.576° S, 55.404° W; Mendes-Pinto and Souza 2011); Sudam Floral Reserve (2.906539917° S, 54.22953033° W; Vertnet database); **Pernambuco:** Mata de Tejió (08.096° S, 34.951° W; Oliveira and Moura 2013); **Rio Grande do Sul:** Universidade Federal de Santa Maria (29.7121° S, 53.7186° W; Santos *et al.* 2005); **Rio Grande do Norte:** Centro Tecnológico de Aquicultura, Extremoz (05.7° S, 35.31°

W; this study); **Rondônia:** Nova Brasília (10.886° S, 61.9125° W; Vanzolini 1986); Usina Hidrelétrica de Samuel (08.7517° S, 63.458° W; Silva Jr and Sites Jr 1995); Pimenta Bueno (11.67° S, 61.2° W; Gainsbury and Colli 2003); Vilhena (12.75° S, 60.15° W; Gainsbury and Colli 2003); Fazenda Jaburi, Espigão do Oeste (11.6° S, 60.716667° W; Macedo *et al.* 2008); **Roraima:** Ilha de Maracá (03.41667°N, 61.6666° W; Ávila-Pires 1995); **São Paulo:** Limeira (22.56667° S, 47.4° W; Vertnet database); **Tocantins:** Jalapão region (10.55° S, 46.75° W; Shepard 2007); Estação Ecológica Serra Geral do Tocantins (10.56° S, 46.5° W; Recoder *et al.* 2011); **ARGENTINA** – Corrientes Province (27.433° S, 58.7856° W; Tedesco and Aguirre 1998); **BOLIVIA** – La Paz: Tumupasa (14.147477° S, 67.8892° W; Doan and Lamar 2012); Rio Surutu, Santa Cruz (17.46° S, 63.694° W; Vertnet database); **GUYANA** – Kartabo (6.383333°N, 58.683333° W; Cole *et al.* 2013); Marudi (02.295278°N, 59.015556° W; Cole *et al.* 2013); Aishalton (02.516667°N, 59.25° W; Cole *et al.* 2013); Paramakatoi (04.716667°N, 59.7° W; Cole *et al.* 2013); Dunoon (06.433333°N, 58.3°

W; Cole *et al.* 2013); District 8, Paramakatoi (04.69722°N, 59.78666° W; Vertnet database); **PERU** – Iquitos (03.745° S, 73.2516° W; Dixon and Soini 1986); Perené (10.9434° S, 75.226° W; Ávila-Pires 1995); Cuzco Amazónico (12.4826° S, 69.321° W; Duellman 2005); Chanchanmayo (11.056813° S, 75.0611° W; Doan and Lamar 2012); Pampa Hermosa (10.993239° S, 75.4213° W; Doan and Lamar, 2012); Cuzco, Quilambada (12.81669998° S, 72.78330231° W; Vertnet database); Cuzco, Madre de Dios (12.58333302° S, 69.08333588° W; Vertnet database); San Martin (06.615277767° S, 76.17082977° W; Vertnet database); Huanuco, Panguana (09.61666° S, 74.9333° W; Vertnet database); Rio Paucartambo, Yaupi (10.74166679° S, 75.53333282° W; Vertnet database); Ucayali, Iparia (9.3° S, 74.5333° W; Vertnet database); Loreto (04.232° S, 74.218° W; Vertnet database); **SURINAME** – Brokopondo (4.9475°N, 55.1507° W; Hoogmoed 1973); Spaliwini (03.6566°N, 56.2035° W; Hoogmoed 1973); Kabalebo (04.542°N, 57.282° W; Ávila-Pires 1995).